SAFTEFAST *for Rail*

Fatigue is a significant problem in all 24/7, safety sensitive transportation modes, mostly due to unpredictable work hours, long duty periods, circadian disruptions, and insufficient sleep that are commonplace in the railroad industry. Fatigue risk needs to be measured and identified with the factors that contribute to risk.

With the Federal Railroad Administration's amendment to 49 CFR Part 228 revising existing Hours of Service regulations, passenger railroad operators now are required to analyze and mitigate the risks for fatigue in certain schedules worked by train employees through the use of an FRA-validated fatigue model.

One of two available human fatigue and circadian variation models approved by the FRA is SAFTE (Sleep, Activity, Fatigue & Task Effectiveness), which was invented by IBR President, Dr. Steven Hursh, who also co-developed FAST (Fatigue Avoidance Scheduling Tool) as a user-friendly application of the model. Customized for the railroad industry, IBR offers SAFTE-FAST *for Rail*, which addresses the need for rapid, ongoing fatigue risk assessments of schedules compliant with FRA regulatory requirements.

With SAFTE-FAST *for Rail*, safer crew scheduling becomes objective and quantifiable by helping safety departments mitigate fatigue risk. SAFTE-FAST *for Rail* provides a foundation for the potential integration of fatigue modeling with everyday scheduling solutions, which can make a comprehensive and data-driven Fatigue Risk Management System an attainable goal for even the largest and most complex railroad operations.

The U.S. Department of Defense considers SAFTE to be the most complete, accurate, and operationally practical model currently available to aid operator scheduling.

SAFE-FAST *for Rail* Features

- Fast, efficient and easy-to-use application
- Specifically designed to meet FRA modeling requirements
- AutoSleep – unique capability to accurately portray sleep patterns affected by shift work patterns, napping, and schedule predictability.
- Batch processing – automated processing of multiple schedules on an as-needed basis
- Aggregate Fatigue Assessment – output table of customizable fatigue metrics, including: total duty time, duty time below criterion (70), average or minimum effectiveness, duty time between 2000 and 0400 (Type II schedules).
- Simplified evaluation of potential changes and "what if" scenarios
- Detailed examination of fatigue factors to guide mitigation

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Why SAFTE-FAST *for Rail*

Unlike FAID – another fatigue model used in the rail industry, SAFTE-FAST *for Rail* is more than a model of sleep opportunities; the SAFTE model at the heart of SAFTE-FAST *for Rail* is a biomathematical model of sleep and performance physiology. SAFTE-FAST *for Rail* gives the user more than a fatigue score; it provides details on fatigue factors at any time in a schedule and detailed "dashboard" metrics that quickly lead to effective mitigation strategies. Often, fatigue risk can be drastically reduced by altering the pattern of work without reducing the quantity of work, preserving productivity and employee earnings. Several studies have demonstrated that SAFTE-FAST *for Rail* has superior sensitivity and specificity for the specific factors that cause fatigue-related accident risk, reducing costly "false positives" common with other models. And because SAFTE-FAST *for Rail* contains an explicit sleep estimation algorithm, it can be tailored to any operation in which workers adopt unique sleep strategies to cope with demanding schedules. The FRA has validated the sleep estimation algorithm within SAFTE-FAST *for Rail* and specific settings can be applied to different work groups.

Additional IBR Services

Scheduling Data Translation Program

The data input specification for SAFTE-FAST *for Rail* is a special XML file that describes work schedules processed as a series of two different types of "events": 1) waypoints, which describe crew member location; and 2) "work" or duty periods. Users unaccustomed to the XML program can purchase a data "translation" tool, tailored for the railroad industry.

Schedule Analysis

Sometimes it is not necessary for companies to purchase a fatigue model, get trained, and analyze schedules on an ongoing basis. For operations with a small number of operating crews or schedules not subject to frequent changes, IBR can process your scheduling data for you and generate reports at pre-determined intervals to meet FRA regulatory requirements. This schedule analysis can save time, money and key human resources for other operational activities.

Fatigue Analysis Integration with Crew Management Software Services

Through strategic collaborations with leading enterprise workforce management software providers specializing in rail crew management and timekeeping solutions, IBR can integrate the SAFTE-FAST *for Rail* fatigue model within your company's existing crew management system. With these combined elements in one system, companies can benefit from value-added services that provide cost-savings, convenience, consistency, and peace of mind.

About Dr. Steven R. Hursh

Dr. Hursh is President of IBR and an internationally recognized expert on modeling the relationship between sleep deprivation and performance. He is a leading authority on Fatigue Risk Management Systems and currently consults for the Federal Aviation Administration, Federal Railroad Administration, US Department of Defense, and private industry.

Hursh, S.R., Raslear, T.G., Kaye, A.S., and Fanzone, J.F. (2006). Validation and calibration of a fatigue assessment tool for railroad work schedules, summary report (Report No. DOT/FRA/ORD-06/21). Washington, DC: U.S. Department of Transportation.

Hursh, S.R., Fanzone, J.F., Raslear, T.G., (2011). Analysis of the Relationship between Operator Effectiveness Measures and Economic Impacts of Rail Accidents (Report No. DOT/FRA/ORD-11/13). Washington, DC: U.S. Department of Transportation.

Measurement and estimation of sleep in railroad worker employees, (2011), Federal Railroad Administration Research Results, RR11-02, Washington, DC: U.S. Department of Transportation.

IBR is the authorized vendor of SAFTE-FAST *for Rail* for the North American railroad industry. We offer immediate access and competitive pricing on all SAFTE-FAST *for Rail* product and service packages.

For more information about SAFTE-FAST *for Rail,* visit www.saftefast.com or send an email to info@saftefast.com.